What is claimed is:

1. A method of fabricating a semiconductor device, the method comprising:

depositing an oxygen-deficient dielectric film; and

subjecting the dielectric film to a wet oxidation in a rapid thermal process chamber at a temperature of at least about 450 °C to increase the oxygen content of the dielectric film.

2. The method of claim 1 wherein the wet oxidation process is performed at a temperature in a range of about 450 °C to about 750 °C.

3. The method of claim 1 wherein the wet oxidation process is performed at a temperature in a range of about 750 °C to about 950 °C.

4. The method of claim 1 wherein the oxidation process is carried out for a duration in a range of about 20 to about 60 seconds.

5. The method of claim 1 wherein subjecting the dielectric film to a wet oxidation includes heating a mixture of hydrogen and oxygen gases wherein the ratio of steam to other gases in the chamber is in the range of about 0.1 to about 0.5.

6. The method of claim 1 wherein subjecting the dielectric film to a wet oxidation includes heating a mixture of hydrogen and oxygen gases wherein the ratio of hydrogen gas to oxygen gas in the mixture is in the range of about 0.1 to about 0.8.

7. The method of claim 1 wherein subjecting the dielectric film to a wet oxidation is performed for a duration such that an oxidizing species does not diffuse significantly through the dielectric film into an underlying layer.

8. The method of claim 1 wherein depositing a dielectric film includes depositing a material having a dielectric constant of at least about 25.

9. The method of claim 1 further including: subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas selected from the group consisting of N_2, O_2, O_3, NO, and N_2O.

10. The method of claim 9 wherein subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas is performed prior to subjecting the film to the wet oxidation.

11. The method of claim 9 wherein the wet oxidation is performed at a temperature less than the temperature for subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas.

12. The method of claim 9 wherein subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas is performed in the rapid thermal process chamber.

13. A method of fabricating a semiconductor device, the method comprising:

depositing a dielectric film over an active region of a semiconductor substrate to form a gate of a transistor; and

subjecting the dielectric film to a wet oxidation in a rapid thermal process chamber at a temperature greater than about 450 °C.

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14. The method of claim 13 wherein the wet oxidation is performed at a temperature in a range of about 750 °C to about 950 °C.

15. The method of claim 13 wherein the oxidation process is carried out for a duration in a range of about 20 to about 60 seconds.

16. The method of claim 13 wherein depositing a dielectric film includes depositing a material having a dielectric constant of at least about 25.

17. The method of claim 13 wherein depositing a dielectric film includes depositing a material selected from the group consisting of tantalum oxide and silicon nitride.

18. A method of fabricating a semiconductor device, the method comprising:

depositing a dielectric film over an active region of a semiconductor substrate to form a gate of a transistor; and

providing steam to a vicinity of the dielectric film while the substrate is in a rapid thermal process chamber at a temperature greater than about 450 C°.

19. The method of claim 18 wherein providing steam includes heating a mixture of hydrogen and oxygen gases, and wherein the ratio of steam to other gases in the chamber is in the range of about 0.1 to about 0.5.

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20. The method of claim 18 wherein providing steam includes heating a mixture of hydrogen and oxygen gases wherein the ratio of hydrogen gas to oxygen gas in the mixture is in the range of about 0.1 to about 0.8.

21. The method of claim 18 wherein the steam is provided to the rapid thermal process chamber using a bubbled water vapor system.

22. The method of claim 18 wherein the steam is provided to the rapid thermal process chamber using a pyrogenic system.

23. The method of claim 18 wherein the steam is provided to the rapid thermal process chamber using a catalytic system.

24. The method of claim 18 wherein providing steam to a vicinity of the dielectric film includes generating steam in the chamber in situ.

25. The method of claim 18 further including:

subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas selected from the group consisting of N_2, O_2, O_3, NO, and N_2O.

26. A method of fabricating a capacitive element for a semiconductor device, the method comprising:

forming a lower electrode of the capacitive element;

depositing a dielectric film over the lower electrode;

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subjecting the dielectric film to a wet oxidation in a rapid thermal process chamber at a temperature of at least about 450 °C;

forming an upper electrode of the capacitive element over the dielectric film.

27. The method of claim 26 wherein the wet oxidation is performed at a temperature in a range of about 750 °C to about 950 °C.

28. The method of claim 26 wherein the oxidation process is carried out for a duration in a range of about 20 to about 60 seconds.

29. The method of claim 26 wherein depositing a dielectric film includes depositing a material having a dielectric constant of at least about 25.

30. The method of claim 26 wherein depositing a dielectric film includes depositing a material selected from the group consisting of tantalum oxide, silicon nitride, barium strontium titanate, strontium titanate, lead zirconium titanate and strontium bismuth tantalate.

31. The method of claim 26 further including:

subjecting the dielectric film to a heat treatment in an ambient comprising a stabilizing gas

selected from the group consisting of N_2, O_2, O_3, NO, and N_2O.

32. The method of claim 26 wherein the wet oxidation is performed for a duration such that an oxidizing species does not significantly affect capacitive properties of the dielectric film.

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33. A method of fabricating a capacitive element for a semiconductor device, the method comprising:

forming a lower electrode of the capacitive element;

depositing a dielectric film over the lower electrode;

providing steam to a vicinity of the dielectric film in a rapid thermal process chamber at a temperature of at least about 450 °C; and

forming an upper electrode of the capacitive element over the dielectric film.

34. The method of claim 33 wherein providing steam includes heating a mixture of hydrogen and oxygen gases and wherein the ratio of steam to other gases in the chamber is in the range of about 0.1 to about 0.5.

35. The method of claim 33 wherein providing steam includes heating a mixture of hydrogen and oxygen gases wherein the ratio of hydrogen gas to oxygen gas in the mixture is in the range of about 0.1 to about 0.8.

36. The method of claim 33 wherein the steam is provided to the rapid thermal process chamber using a bubbled water vapor system.

37. The method of claim 33 wherein the steam is provided to the rapid thermal process chamber using a pyrogenic system.

38. The method of claim 33 wherein the steam is provided to the rapid thermal process chamber using a catalytic system.

39. The method of claim 33 wherein providing steam to a vicinity of the dielectric film includes generating steam in the chamber in situ.

40. The method of claim 33 wherein providing steam to a vicinity of the dielectric film is performed for a duration such that an oxidizing species does not diffuse significantly through the dielectric film so as to oxidize the lower electrode.